

Access evolved?

Versatile open access policies are evolving together with scholarly information, but copyright issues remain unsettled

Just over a decade ago, the contemplative world of scholarly publishing felt the first tremors of a seismic shift in the way in which science is published. Journals and their publishers were shaken by the impact of the world wide web, and a growing feeling among the scientific community that their work should be openly accessible to fellow scientists and the public. The so-called open access (OA) movement has since gained much momentum and found increasing support among politicians, funding agencies and leading scientists. Various 'pure' OA journals have been established, while OA activists have sought to expand OA to traditional journals. Not surprisingly, such a radical shift in the way science is published and used has created some bitter controversies about the future of publishing and the communication of science.

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Nevertheless, after years of fierce debate about the right of scientists and the lay public to freely read, distribute and re-use the results of publicly funded research—as opposed to the interests of commercial publishers to make money—the discussion seems to be becoming more mature and rational. “We are entering a pluralistic phase, where open access and traditional publishing coexist, though they increasingly are finding their own distinctive places in the research universe and are less likely to compete head-on,” commented publishing industry consultant Joseph Esposito (Esposito, 2007).

In Esposito's view, scientific publishing is shaped like a Nautilus shell, where OA publishing is—or should be—at the centre because it “is most meaningful within a small

community whose members know each other and formally and informally exchange the terms of discourse” (Esposito, 2007). Publishing an OA article within this core, among a close group of well-known peers, would not require all of the usual services that commercial publishers provide and dissemination would be economically sustainable. At the next turn of the spiral—where people work in progressively more distant areas or are more generally interested in research findings—increasingly larger and more expensive editorial and production infrastructures are required to organize peer review, production and dissemination.

According to the definition proposed at the Budapest Open Access Initiative meeting in 2001, OA is the right of users to “read, download, copy, distribute, print, search, or link to the full texts of these [original scientific research] articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose [...] The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited” (www.soros.org/openaccess). Later statements, from meetings in Bethesda and Berlin in 2003, suggested further amendments to the rights of authors as copyright holders. True OA, they asserted, must grant users “a free, irrevocable, worldwide, perpetual right of access to, and a licence to copy, use, distribute, transmit and display the work publicly and to make and distribute derivative works, in any digital medium for any responsible purpose, subject to proper attribution of authorship, as well as the right to make small numbers of printed copies for their personal use” (www.pubmedcentral.nih.gov).

In practice, OA journals seek to cover their editorial and production costs by charging authors to publish and thus make the final article freely available on the internet. In addition, OA journals require

authors to sign a copyright licence that fulfils at least the Budapest definition of OA. Critics of OA publishing assert that this business model—charging the provider instead of the user—has still to show its economic sustainability. However, OA—in the truest sense of its values of free access and free use—is not limited to publications in journals, but also includes the online distribution of pre-print manuscripts, working papers, technical notes, patents, videos and podcasts, all of which researchers put on their personal home pages or are hosted in institutional repositories.

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OA would not have been possible without the technological revolution of the world wide web, which has made scholarly communication a fluid and interactive process, with change and innovation progressing day by day. Dissemination of information on the internet is instant, global and dynamic, and proponents of OA argue that this new medium of communication is hindered in its ability to advance science further and faster by barriers of cost, access and use.

In any case, OA has begun to transform the copyright model used by traditional publishers. Historically, the author(s) of an article—while retaining the right to be acknowledged as the creator(s) of the work—usually transferred all other rights to the publisher. In practice, this meant that the publisher had full control over the distribution, use and re-use of scholarly material. Access to and the republication of a paper—even for educational purposes or by the author himself—thus depended on permission from the publisher. OA, instead, limits copyright and licencing restrictions to enable the right for re-use for any responsible purpose (Fig 1).

The leading OA publishers—the Public Library of Science (PLOS; San Francisco, CA, USA) and BioMed Central (London, UK)—have adopted the Creative Commons approach. Under this licencing scheme, the authors retain the copyright to their work and licence the publisher to disseminate the article. Depending on the particular

licence, the authors also allow any third party to use the article or parts thereof.

According to Jordan Hatcher, a lawyer and consultant specializing in copyright issues, small and medium-sized publishers that provide scientific articles online could adopt one of four main copyright enforcement strategies. These start with releasing the work to the public domain—no rights reserved—and end with full copyright—all rights reserved. The middle ground—some rights reserved—is similar to Creative Commons licences and what Hatcher calls the “all rights reserved with ‘light’ enforcement” approach—in which publishers do not give permission to use their content, but only enforce their copyright selectively in practice (Hatcher, 2008). “Scientific content publishers would share many of the same concerns as other SME [small and medium enterprise] online content producers and would probably not opt for a heavy enforcement strategy given the possible negative publicity and high cost that it involves,” Hatcher said. “Between the two middle approaches—open content and light enforcement—an Open Access scientific content publisher should opt for a licencing strategy that fits the norms and ideals of the open access movement, which would mean some sort of open content or similar licence that gives broad permission to the user up front.”

Two years ago, Dutch information specialists Esther Hoorn and Maurits van der Graaf surveyed the attitudes of academics—corresponding authors of OA articles, largely working in the biomedical and life sciences—towards OA in the UK and the Netherlands (Hoorn & van der Graaf, 2006). When asked which copyright model they believed was more fair, almost half of the respondents chose a model in which the authors retain their copyright and grant a journal a licence to publish the article as the first publisher. About one-third of the respondents chose models in which copyright is regulated by Creative Commons licences, while a small percentage of respondents preferred a model in which authors retain copyright, but transfer an exclusive licence for commercial exploitation to the publisher. In the latter case, authors might still post the original manuscript on their personal or institutional website, or make copies for personal or non-commercial use without having to ask the publisher for permission. Most OA authors in this study thus

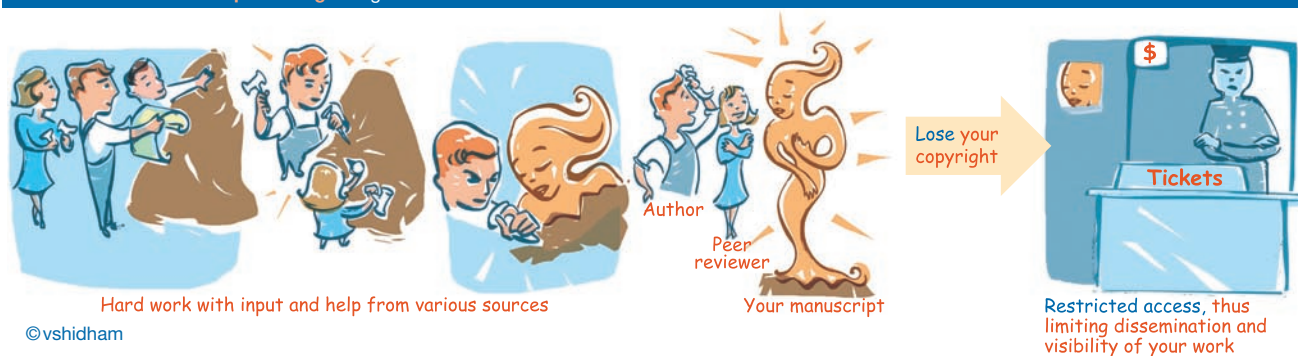
preferred to retain their copyright, but would allow re-use of their papers for educational and scholarly purposes, while limiting commercial exploitation (Hoorn & van der Graaf, 2006).

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This type of model is actually already in use, as the authors of the study pointed out. The *Electronic Journal of Comparative Law*, for example, allows authors to retain their copyright, but grants free personal and classroom use of the work by others provided that the authors and the journal are credited. Similarly, the Creative Commons licences now used by most journals could be enforced to include a non-commercial clause at the request of authors. This system has already been adopted by the OA journal *Molecular Systems Biology*, which now lets authors choose which Creative Commons licence they wish to sign.

This so-called ‘golden’ form of OA publishing—in which the publisher manages the distribution of and open access to the paper—still relies on scholarly journals to organize the peer review and dissemination. Another version of OA, proposed by Stevan Harnad and often referred to as ‘green’ OA, involves authors or institutions self-archiving their work. Harnad, a cognitive scientist at the University of Southampton, UK, first began promoting the self-archiving of research articles more than a decade ago (Harnad, 2001). Under this system, authors upload a final draft of their articles to their personal website or place it in an institutional repository, which everyone can then access online. The University of Southampton’s School of Electronics and Computer Science, in particular, has become a centre of ‘OA archivengialism’, and has created a platform for constructing and sharing digital repositories (www.eprints.org). An increasing number of universities, library associations and funding agencies have joined the self-archiving movement and have created a network of interoperable archives. Through these, documents can be jointly searched and retrieved

A Traditional method of publishing owing to lack of alternative



B Now alternative opportunity to publish in open access is a reality

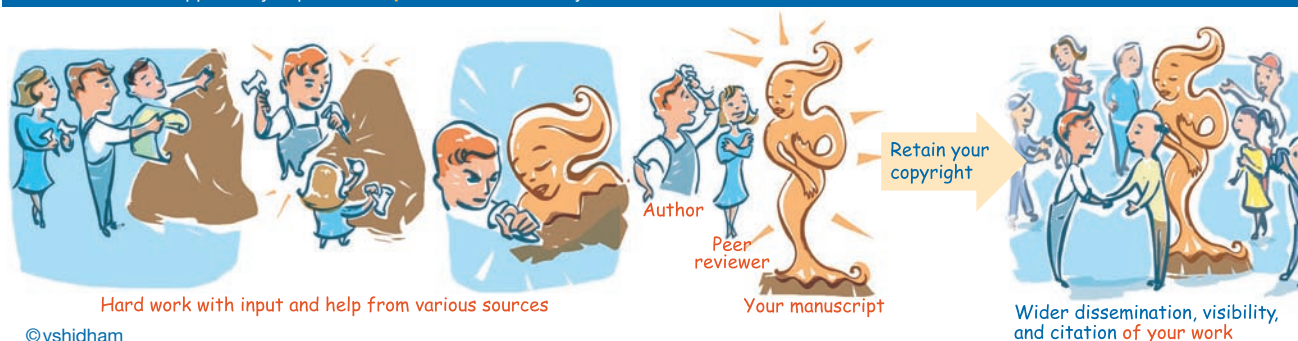


Fig 1 | Open access versus the traditional publishing model, as seen through the eyes of Montreal-based artist Beatrice Favereau. Image from Shidham *et al*, 2006.

through a common code of metadata tags as though they were in a global collection.

Not surprisingly, the supporters of self-archiving welcomed the recent OA self-archiving policy of the USA's National Institutes of Health (NIH; Bethesda, MD, USA). On December 26, 2007, US President George W Bush signed into law a bill that requires the NIH to provide online open access to findings from the research it funds within 12 months of publication in a journal. The new NIH policy covers all peer-reviewed and accepted articles reporting findings that were—in whole or in part—directly funded by NIH, or were from NIH staff. To enforce the new policy, researchers submitting a grant proposal or progress report to the NIH will need to include the PubMed Central or NIH submission reference number when citing applicable articles that arise from their NIH-funded research. NIH-funded scientists and their institutions are also responsible for ensuring that any publishing or copyright agreements comply with the policy. Although the bill falls short of the six-month deadline that some campaigners were calling for, it is the first time that the US Government has mandated public access to research funded by a major agency, and many now think it

could spread to other US institutions such as the National Science Foundation (NSF; Arlington, VA, USA).

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The publishers of several scientific journals have criticized the NIH policy because it affects both the current business and copyright models of scientific publishing. They have been lobbying members of Congress to make them more sensible to their arguments. Allan Adler, Vice President of the Association of American Publishers (AAP; Washington, DC, USA), commented that the new policy is unprecedented and inconsistent with US laws and policies regarding the conduct of scientific research and the protection of intellectual property rights (AAP, 2007). "It undermines [the] publishers' ability to exercise their copyrights in the published articles, which is the means by which they support their investments," he commented in a press

release. "The NIH policy also threatens the intellectual freedom of authors, including their choice to seek publication in journals that may refuse to accept proposed articles that would be subject to the new mandate."

Advocates of OA maintain that the new law does not affect the publishers' copyright, because the investigator has already granted PubMed Central a non-exclusive licence to use the article as a condition for receiving NIH funding, and the copyright that the author transfers to the publisher is already subject to this licence. In Adler's opinion, instead of agreeing to the NIH mandate, Congress should have adopted the America Competes Act of August 2007, which instructs the NSF to "ensure that all final project reports and citations of published research documents resulting from research funded, in whole or in part, by the Foundation, are made available to the public in a timely manner and in electronic form through the Foundation's Web site".

The NIH is not the only funding agency to make this shift towards supporting OA; last year, the European Research Council (ERC; Brussels, Belgium) also adopted an OA self-archiving mandate.

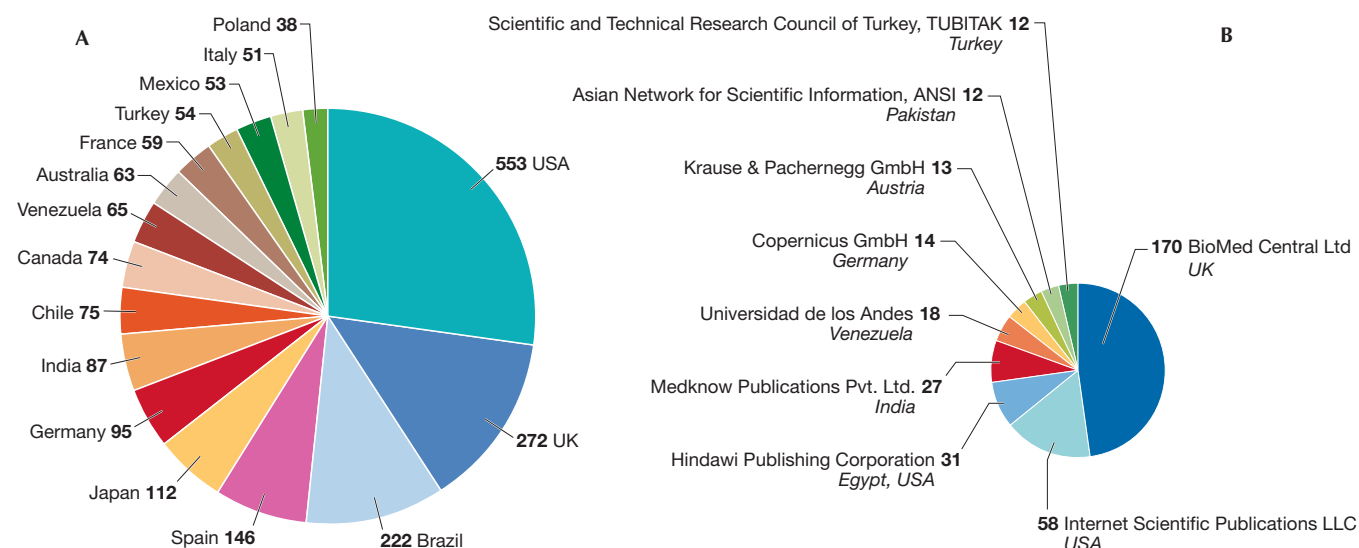


Fig 2 | Dissemination of open access journals worldwide. (A) Journals per country and (B) top publishers with more than ten journals listed in the Directory of Open Access Journals. Credit: DOAJ team; data as of September 2007.

“The ERC requires that all peer-reviewed publications from ERC-funded research projects be deposited on publication into an appropriate research repository where available, such as PubMed Central, ArXiv or an institutional repository, and subsequently made open access within six-months of publication” the ERC declared (ERC, 2007). Similarly, the Howard Hughes Medical Institute (HHMI; Chevy Chase, MD, USA) and Elsevier (Amsterdam, The Netherlands) agreed to make the manuscripts of HHMI-funded research articles published by Elsevier and Cell Press journals publicly available six months after publication, while HHMI will pay Elsevier to deposit the manuscripts—accepted for publication, but not edited or formatted—in PubMed Central. HHMI has subsequently announced a similar agreement with BioMed Central, under which HHMI will pay any processing charges for all research published by HHMI investigators in BioMed Central journals. These and other agreements prepared the ground for a new policy that will now require HHMI scientists to publish original research articles in journals that make their content freely accessible within six months of publication. “We have sought to balance the goal of public access with the important principle of scholarly freedom in the formulation of this policy and believe that it represents a positive step for us and for

the broader scientific community,” commented HHMI’s president Thomas Cech in a related press release (HHMI, 2007). Similarly, the Wellcome Trust (London, UK) requires electronic copies of any research papers it has supported—in whole or in part—to be made publicly accessible within six months of publication. The Trust recognizes that open access fees are a legitimate research cost and provides grantees with additional funding. Just two months ago, Harvard University’s Faculty of Arts and Sciences (Cambridge, MA, USA) also adopted an OA mandate to create a repository for hosting faculty members’ articles and to make them freely available (Harvard University Gazette Online, 2008).

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However, both commercial and academic publishers fear that OA will have a negative effect on the biodiversity of scientific publishing, especially for journals published by small and non-profit scientific societies. “The NIH plan threatens many of the smaller journals that are published less

frequently but publish a significant percentage of NIH funded content,” warned Martin Frank, Executive Director of the American Physiological Society (Bethesda, MD, USA). “While many society journals already make their content freely available from their journal sites within 12 months of publication, there are a number of small niche journals that do not,” said Frank. “The NIH policy and those of HHMI, Wellcome Trust, etc., that mandate free access after six-months, could lead to the demise of these journals. Some might say that is acceptable, but because they fill a need in a defined research area, their demise could be catastrophic for the field.” Journal publishers also worry about the impact of self-archiving, fearing that it might shrink their business down to a non-sustainable size.

Notwithstanding copyright and budgetary issues, the number of OA journals and journals that allow OA publishing through hybrid models is increasing. The Directory of Open Access Journals (www.doaj.org), at Lund University in Sweden, now lists more than 3,000 journals (Fig 2). Meanwhile, PLoS is expanding its panel of OA journals and recently launched *PLoS Neglected Tropical Diseases*. Traditional publishers, after initially refusing to mingle with the new model, “are attempting, with increasing success, to extend their reach into the inner

spirals, pre-empting and co-opting open-access initiatives wherever they can,” noted Esposito (2007). Indeed, many journals have adopted a hybrid model under which the authors decide whether to pay to make their article freely available. Alessandro Chiarucci, one of the Chief Editors of the *Journal of Vegetation Science* commented that, “OA is now routinely available for a subset of papers such as those in the Forum and Invited Perspectives sections. In addition, there is an OA option based on payment by the authors of a fee [...] We try to keep the cost of this option low in comparison to the fees charged by many of the larger publishing companies.”

Indeed, scholarly information systems are exploring new modes of scientific dissemination that seem only to be limited by the imaginations of their proponents. “It would be interesting to see whether the group of authors [that was] publishing in

OA journals during our research is now engaging in open access blogs and wikis,” Hoorn said of the increasing use of social software. Interestingly, it is the commercial Nature Publishing Group (London, UK) that has invested significant amounts of money into such interactive services—including blogs, podcasts and even the online multiverse Second Life. In any case, it will take some time before a new equilibrium—if any is possible—is reached among the various competing modes of scholarly publishing and communication.

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